

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

Ex parte MICHIIHIKO YANAGISAWA, KAZUYUKI TSURUOKA  
and CHIKAI TANAKA

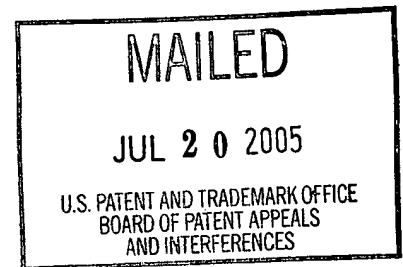
---

Appeal No. 2005-0900  
Application No. 10/098,588

---

ON BRIEF

---



Before HAIRSTON, KRASS and JERRY SMITH, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 2, 3, 8 and 9, which constitute all the claims pending in the application.

The disclosed invention pertains to a local dry etching apparatus for removing unevenness on a surface of a semiconductor wafer.

Appeal No. 2005-0900  
Application No. 10/098,588

Representative claim 2 is reproduced as follows:

2. A local dry etching apparatus for removing unevenness on a surface of a semiconductor wafer, comprising:

a nozzle from which a gas including an activated species produced by a plasma is injected locally to the surface of the semiconductor wafer; and

a wafer table supporting the semiconductor wafer concentrically thereon, a radius of the wafer table being larger than a radius of the semiconductor wafer,

wherein a difference between the radius of the semiconductor wafer and the radius of the wafer table is 10 to 40 percent of a half value width of an etching rate distribution peak of the gas injected from the nozzle.

The examiner relies on the following references:

Yanagisawa et al. (Yanagisawa)	5,980,769	Nov. 09, 1999
Shinozuka et al. (Shinozuka)	6,136,213	Oct. 24, 2000

Claims 2, 3, 8 and 9 stand rejected under 35 U.S.C.

§ 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellants regard as the invention. Claims 2, 3, 8 and 9 also stand rejected under 35 U.S.C. § 103(a). As evidence of obviousness the examiner offers Yanagisawa in view of Shinozuka.

Appeal No. 2005-0900  
Application No. 10/098,588

Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs and the answer for the respective details thereof.

#### OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the prior art rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the claims on appeal are in compliance with the second paragraph of 35 U.S.C. § 112. We are also of the view that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in the claims on appeal. Accordingly, we reverse.

Appeal No. 2005-0900  
Application No. 10/098,588

We consider first the rejection of claims 2, 3, 8 and 9 under the second paragraph of 35 U.S.C. § 112. The rejection states that the radius of the supporting face of the wafer table is compared to objects whose length is variable. The examiner also states that in addition to comparing the support face size to the substrate size, it is also compared to an indefinite length parameter "half value width" referred to in the specification (answer, page 3).

Appellants argue that the examiner has failed to take into account the level of skill of persons skilled in this art. Specifically, appellants argue that persons skilled in this art would understand that a half value width is the width of a peak at its half maximum value. Appellants note that once an etching rate distribution peak is obtained as shown in Figure 2, persons skilled in the art would understand what is covered by the claims (brief, pages 3-7).

The examiner responds that it would be possible to find parameters which would result in a "half value width" which could make any other design an infringement, including the ones which did not use the approach taken by appellants (answer, page 5).

Appeal No. 2005-0900  
Application No. 10/098,588

Appellants respond that the half value width limitation of the claims provides clear warning of what is patent infringement of the claimed invention (reply brief, pages 2-3).

We will not sustain the examiner's rejection of claims 2, 3, 8 and 9 under 35 U.S.C. § 112. The general rule is that a claim must set out and circumscribe a particular area with a reasonable degree of precision and particularity when read in light of the disclosure as it would be by the artisan. In re Moore, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971). Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed in light of the specification. Seattle Box Co., v. Industrial Crating & Packing, Inc., 731 F.2d 818, 826, 221 USPQ 568, 574 (Fed. Cir. 1984). We agree with appellants that the scope of the claimed invention is clear. When an etching nozzle is operated, it has a known etching rate and, therefore, it also has a known half value width as shown in appellants' Figure 2. Since the claimed invention defines the relationship of the radius of the semiconductor wafer and the radius of the wafer table in terms of

Appeal No. 2005-0900  
Application No. 10/098,588

this known half value width, there is no reason why persons skilled in this art would be unable to ascertain whether or not the claimed invention is being infringed.

We now consider the rejection of claims 2, 3, 8 and 9 under 35 U.S.C. § 103 based on Yanagisawa and Shinozuka. In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227

Appeal No. 2005-0900  
Application No. 10/098,588

USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered and are deemed to be waived (see 37 CFR § 41.37(c)(1)(vii)(2004)).

The examiner has indicated how he finds the claimed invention to be obvious over the teachings of Yanagisawa and

Appeal No. 2005-0900  
Application No. 10/098,588

Shinozuka (answer, page 4). Appellants argue that the examiner has failed to establish a prima facie case of obviousness because he failed to show that the prior art teaches the limitations of claims 2 and 8 with respect to the wherein clause. Appellants argue that the examiner has attempted to find the limitations of dependent claims 3 and 9, but these findings do not support the unpatentability of independent claims 2 and 8. Appellants also argue that the assumptions made by the examiner with respect to the nozzle size of the prior art are totally unsupported by the applied prior art (brief, pages 7-10).

The examiner responds that based on his assumptions, the artisan would have designed a semiconductor wafer radius and a wafer table radius that satisfy the values recited in dependent claims 3 and 9. Since the dependent claims must be consistent with the independent claims, the examiner asserts that the obviousness of claims 3 and 9 means that independent claims 2 and 8 must also be obvious (answer, page 5).

Appellants respond that even if the examiner found the dimensions of the wafer and wafer table as recited in claims 3 and 9, that would not render independent claims 2 and 8 obvious



Appeal No. 2005-0900  
Application No. 10/098,588

because they include the half value width limitations which are not disclosed by the applied prior art. Appellants note that neither Yanagisawa nor Shinozuka teaches the claimed half value width limitation of claims 2 and 8. Appellants also repeat their argument that the examiner's assumptions regarding nozzle size and etch spot size are incorrect and unsupported by the prior art (reply brief, pages 3-4).

We will not sustain the examiner's rejection of claims 2, 3, 8 and 9 under 35 U.S.C. § 103 for essentially the reasons argued by appellants in the briefs. Most importantly, the examiner has failed to point to any teachings in either Yanagisawa or Shinozuka which relate to the half value width of an etching rate distribution peak of the gas injected from the nozzle, and we have found no such teaching in either reference. We agree with appellants that independent claims 2 and 8, which recite the relationship of the wafer table radius and the wafer radius to the half value width of an etching rate distribution peak, cannot be rendered obvious by simply finding wafer table

Appeal No. 2005-0900  
Application No. 10/098,588


and wafer radii which are consistent with dependent claims 3 and 9. The values recited in claims 3 and 9 must still have the relationship based on the half value width recited in independent claims 2 and 8. Since there is no mention in Yanagisawa or Shinozuka that the half value width is determined, then there is no support in the applied prior art for the rejection of claims 2 and 8. We also agree with appellants that the examiner's assumptions regarding wafer table size and wafer size are only speculative on the part of the examiner and have nothing to do with the half value width of an etching rate as claimed.

Appeal No. 2005-0900  
Application No. 10/098,588

In summary, we have not sustained either of the examiner's rejections of the claims on appeal. Therefore, the decision of the examiner rejecting claims 2, 3, 8 and 9 is reversed.

REVERSED

  
KENNETH W. HAIRSTON )  
Administrative Patent Judge )

  
ERROL A. KRASS ) BOARD OF PATENT  
Administrative Patent Judge ) APPEALS AND  
INTERFERENCES )

  
JERRY SMITH )  
Administrative Patent Judge )

JS:hh

Appeal No. 2005-0900  
Application No. 10/098,588

BARRY E. BRETSCHNEIDER  
MORRISON & FOERSTER, LLP  
STE. 5500  
2000 PENNSYLVANIA AVE., N.W.  
WASHINGTON, D.C. 20006-1888